

**United States of America
FEDERAL COMMUNICATIONS COMMISSION
EXPERIMENTAL
RADIO STATION CONSTRUCTION PERMIT
AND LICENSE**

EXPERIMENTAL

(Nature of Service)

XC FX MO

(Class of Station)

WL2XCN

(Call Sign)

0430-EX-CN-2020

(File Number)

NAME Space Exploration Technologies Corp.

Subject to the provisions of the Communications Act of 1934, subsequent acts, and treaties, and all regulations heretofore or hereafter made by this Commission, and further subject to the conditions and requirements set forth in this license, the licensee hereof is hereby authorized to use and operate the radio transmitting facilities hereinafter described for radio communications in accordance with the program of experimentation described by the licensee in its application for license.

Operation: In accordance with Sec. 5.3(c) of the Commission's Rules

Station Locations

- (1) Redmond (KING), WA - NL 47-41-39; WL 122-01-58
- (2) MOBILE: Edwards AFB, CA: Airborne max alt 40,000 ft AGL, within 1000 km, centered around NL 34-55-11; WL 117-53-16
- (3) Panaca (LINCOLN), NV - NL 37-47-01; WL 114-41-34
- (4) Edwards AFB (KERN), CA - NL 34-55-11; WL 117-53-16

Frequency Information

Redmond (KING), WA - NL 47-41-39; WL 122-01-58

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
14000-14500 MHz	FX	240MD7W	5.1 kW (ERP)	0.001 %
28.35-29.1 GHz	FX	480MD7W 240MD7W 120MD7W 60MD7W	2.72 MW (ERP)	0.001 %
29.5-30 GHz	FX	480MD7W	2.72 MW (ERP)	0.001 %

This authorization effective July 15, 2020 and
will expire 3:00 A.M. EST August 01, 2021

**FEDERAL
COMMUNICATIONS
COMMISSION**



Frequency Information

Redmond (KING), WA - NL 47-41-39; WL 122-01-58

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
29.5-30 GHz	FX	240MD7W 120MD7W 60M0D7W	2.72 MW (ERP)	0.001 %

MOBILE: Edwards AFB, CA: Airborne max alt 40,000 ft AGL, within 1000 km, centered around NL 34-55-11; WL 117-53-16

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
14000-14500 MHz	MO	240MD7W	5.1 kW (ERP)	0.001 %

Panaca (LINCOLN), NV - NL 37-47-01; WL 114-41-34

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
27.5-29.1 GHz	FX	480MD7W 240MD7W 120MD7W 60M0D7W	2.72 MW (ERP)	0.001 %
29.5-30 GHz	FX	480MD7W 240MD7W 120MD7W 60M0D7W	2.72 MW (ERP)	0.001 %

Frequency Information

Edwards AFB (KERN), CA - NL 34-55-11; WL 117-53-16

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
14000-14500 MHz	FX	240MD7W	5.1 kW (ERP)	0.001 %

Special Conditions:

- (1) Licensee should be aware that other stations may be licensed on these frequencies and if any interference occurs, the licensee of this authorization will be subject to immediate shut down.
- (2) The station identification requirements of Section 5.115 of the Commission's Rules are waived.
- (3) This authorization is issued for the express purpose of conducting experimental operations described in the related application and required by US Air Force contract no. FA8650-19-9-9320. The use of this radio station in any other manner or for any other purpose will constitute a violation of the privileges herein authorized. Except as subsequently authorized by the Commission, this radio station shall not be operated after the expiration date of the contract designated in the related application and enumerated above.
- (4) Stop buzzer: Kristi Key
Phone Number: 3109708116
E-Mail Address: kristina.key@spacex.com
- (5) POINT OF COMMUNICATION: Space Exploration Technologies Corp. ("SpaceX")'s Ka-band and Ku-band non-geostationary- orbit (NGSO) satellites.
- (6) Operations in the 14.0-14.5 GHz (Ku-band), 28.35-29.1 GHz, 29.3-30 GHz (Ka-band) frequency bands must be in compliance with Section 25.146(a)(2) of the Commission's rules and Article 22, Section II, and Resolution 76 of the ITU Radio Regulations. In the 14.0-14.5 GHz frequency band, the equivalent power flux-density (EPFD) limit in the Earth-to-space direction (EPFDup) must not exceed -160 dBW/m² in 40 kHz. In the 28.35-29.1 GHz, 29.3-30 GHz bands, the EPFDup must not exceed -162 dBW/m² in 40 kHz bandwidth.
- (7) The authorized earth station transmitter must be turned off whenever (1) there is no SpaceX satellite in view at an elevation angle of at least 25 degrees, or (2) the direction of the SpaceX earth station transmit beam and the GSO arc is separated by less than 18°. Operations in the 14.0-14.5 GHz, 28.35-29.1 GHz, 29.3-30 GHz frequency bands must maintain +18° of avoidance angle (exclusion zone) with the GSO arc at all times. As the earth station is tracking SpaceX's NGSO satellites, it must not radiate within + 18° of the GSO arc.
- (8) The authorized airborne antenna on board aircraft (ESAAs) in aircraft on the ground must not transmit at elevation angles less than three degrees. There is no minimum angle of antenna elevation for ESAAs while airborne.

Special Conditions:

- (9) Operations of the authorized airborne antenna on board aircraft (ESAA) operating in the 14.14.5 GHz band must be in compliance with the following additional conditions:
- a. Licensee's ESAA must employ a tracking algorithm that is resistant to capturing and tracking adjacent satellite signals, and each station must be capable of inhibiting its own transmission in the event it detects unintended satellite tracking.
 - b. Licensee's ESAA must be monitored and controlled by a ground-based network control and monitoring center. Such stations must be able to receive "enable transmission" and "disable transmission" commands from the network control center and must cease transmission immediately after receiving a "parameter change" command until receiving an "enable transmission" command from the network control center. The network control center must monitor operation of each earth station to determine if it is malfunctioning, and each earth station must self-monitor and automatically cease transmission on detecting an operational fault that could cause harmful interference to a fixed satellite service network.
 - c. Licensee must maintain a point of contact available 24 hours per day, seven days per week, with the authority and ability to terminate operations authorized herein, for discussing interference concerns with other licensees, and must submit a letter to be included in its license file with the name and telephone number of the point of contact prior to commencing operation.